

2-DIST
04B.I.N.
2BQ

UNDERWATER OPERATIONS TEAM

ROUTINE UNDERWATER INSPECTION REPORT

BR. DEPT. NO.
L-15-031

CITY/TOWN LOWELL		8-STRUCTURE NO. L15031-2BQ-MUN-NBI		LEVEL OF INSPECTION II		93B-DATE INSPECTED MAR 4, 2015	
07-FACILITY CARRIED HWY LAWRENCE ST		ACCESS TO BRIDGE EMBANKMENT		UNDERWATER OPERATIONS ENGINEER RANDI E. BONICA			
06-FEATURES INTERSECTED WATER CONCORD RIVER		DEPTH 1.5 m	VISIBILITY 0.7 m	TEAM LEADER (DIVE MASTER) WILLIAM J. COLLERAN		Report submitted by:	
BOTTOM CONDITION ANGULAR STONES, LEDGE		CURRENT MODERATE		TEAM MEMBERS R. E. BONICA, G. BROZ, M. GRIFFIN			

ITEM 60 SUBSTRUCTURE		5 DEF	ITEM 61 CHANNEL & CHANNEL PROTECTION		5 DEF	ITEM 62 CULVERTS		N DEF			
1. Abutments	5		1. Channel Scour	5	M-P	1. Roof	N	-			
a. Pedestals	N	-	2. Embankment Erosion	H	-	2. Floor	N	-			
b. Bridge Seats	N	-	3. Debris	6	-	3. Walls	N	-			
c. Backwalls	N	-	4. Vegetation	7	-	4. Headwall	N	-			
d. Breastwalls	5	-	5. Utilities	N	-	5. Wingwall	N	-			
e. Wingwalls	N	-	6. Rip-Rap/Slope Protection	H	-	6. Pipe	N	-			
f. Slope Paving/Rip-Rap	H	-	7. Aggradation	8	-	7. Protective Coating	N	-			
g. Pointing	N	-	8. Fender System	N	-	8. Embankment	N	-			
h. Footings	X	-	a. Piles	N	-	9. Wearing Surface	N	-			
i. Piles	X	-	b. Diagonal Bracing	N	-	10. Railing	N	-			
j. Scour	5	M-P	c. Horizontal Bracing	N	-	11. Sidewalks	N	-			
k. Settlement	6	-	d. Wales	N	-	12. Utilities	N	-			
l. Curtain Wall	6	-	e. Fasteners	N	-	13. Member Alignment	N	-			
2. Piers or Bents	5		f. Ladders	N	-	14. Deformation	N	-			
a. Pedestals	N	-	9.	N	-	15. Scour	N	-			
b. Caps	N	-	ITEM 59 SUPERSTRUCTURE			16. Settlement	N	-			
c. Columns	N	-					N	-	17.	N	-
d. Stems/Webs/Pierwalls	5	-					N	-	18.	N	-
e. Pointing	N	-				UNDERMINING (Y/N)					
f. Footing	H	-				N					
g. Piles	X	-	<div style="border: 1px solid black; padding: 5px;"> <h3 style="text-align: center; margin: 0;">DEFICIENCY REPORTING GUIDE</h3> <p>DEFICIENCY: A defect in a structure that requires corrective action.</p> <p>CATEGORIES OF DEFICIENCIES:</p> <p>M= Minor Deficiency- Deficiencies which are minor in nature, generally do not impact the structural integrity of the bridge and could easily be repaired. Examples include but are not limited to: Spalled concrete, Minor scouring, etc.</p> <p>S= Severe/Major Deficiency- Deficiencies which are more extensive in nature and need more planning and effort to repair. Examples include but are not limited to: Moderate to major deterioration in concrete, Exposed and corroding rebars, Deteriorated timber piles, Considerable settlement, Considerable scouring or undermining, etc.</p> <p>C-S= Critical Structural Deficiency- A deficiency in a structural element of a bridge that poses an extreme unsafe condition due to the failure or imminent failure of the element which will affect the structural integrity of the bridge.</p> <p>C-H= Critical Hazard Deficiency- A deficiency in a component or element of a bridge that poses an extreme hazard or unsafe condition to the public, but does not impair the structural integrity of the bridge. Examples include but are not limited to: Any part of piles or fender system which are projecting outward and may become a safety hazard for the navigational traffic, etc.</p> <p>URGENCY OF REPAIR:</p> <p>I=Immediate- [Inspector(s) immediately contact District Bridge Inspection Engineer (DBIE) to report the Deficiency and to receive further instruction from him/her.]</p> <p>A=ASAP- [Action/Repair should be initiated by District Maintenance Engineer or the responsible party (if not a State owned bridge) upon receipt of the Inspection Report.]</p> <p>P=Prioritize- [Shall be prioritized by District Maintenance Engineer or the Responsible Party (if not a State owned bridge) and repairs made when funds and/or manpower is available.]</p> </div>								
h. Scour	6	-									
i. Settlement	5	-									
j. Curtain Walls	5	M-P									
k.	N	-									
3. Pile Bents	N										
a. Pile Caps	N	-									
b. Piles	N	-									
c. Diagonal Bracing	N	-									
d. Horizontal Bracing	N	-									
e. Fasteners	N	-									
UNDERMINING (Y/N)		N									

X=UNKNOWN

N=NOT APPLICABLE

H=HIDDEN/INACCESSIBLE

R=REMOVED

CITY/TOWN LOWELL	B.I.N. 2BQ	BR. DEPT. NO. L-15-031	8.-STRUCTURE NO. L15031-2BQ-MUN-NBI	INSPECTION DATE MAR 4, 2015
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REMARKS

GENERAL REMARKS

This bridge is a six span structure supported by two abutments and five piers. There is a concrete extension (18'+/- long) at the upstream end. The original downstream sections of the abutments and piers are fieldstone except for the right abutment which is concrete (possibly a concrete fascia). The original fieldstone is covered with sprayed gunite below the bridge seat to approximately the waterline.

There are concrete curtain walls at the concrete extensions at Piers #1 - #5 and the entire length of the right abutment. The irregular tops of the curtain walls are below the waterline.

Abutments are labeled left and right, looking downstream. Sta 1+00 is at the downstream end. The concrete extension starts at Sta 1+60. The upstream end of the bridge is Sta 1+78. Piers are numbered from left to right.

Diver Warning: There is a 1/2" diameter steel cable at the the upstream end. It is partially attached to eye-bolts at the piers. The cable is broken and is below the waterline.

There are numerous shopping carts, bicycles and other debris under the bridge.

There is a dam downstream.

ITEM 60 - SUBSTRUCTURE

Item 60.1 - Abutments

Item 60.1.d - Breastwalls

Left Abutment:

Concrete Extension: There are random areas of concrete deterioration in the concrete extension from the mudline to above the waterline. At Sta 1+59, approximately 1' above the mudline, there is concrete deterioration 1.4' long, 1.4' high, and 1.4' penetration.

There is moderate concrete abrasion with coarse aggregate exposed approximately 3' high and up to 0.2' penetration. There is rusty rebar exposed at the upstream end at the waterline.

Right Abutment:

At Sta 1+15 there is concrete deterioration above the curtain wall 3.0' long, 0.5' high, and 0.5' penetration. There is moderate concrete abrasion with coarse aggregate exposed approximately 3' high and up to 0.2' penetration.

Item 60.1.f - Slope Paving/Rip-Rap

At the time of this inspection rip-rap was covered with snow and could not be rated. The previous inspection dated 12/5/12 reported the rip-rap was in good condition.

Item 60.1.j - Scour

Right Abutment:

There is a concrete curtain wall along the entire length of the abutment. The width of the curtain wall varies. Maximum width is 1.2'. The curtain wall is undermined for the entire length. Maximum height of undermining is 1.0', maximum penetration is 3.0'. At this location the curtain wall is 1.2' wide so this penetration is 1.8' into or under the abutment.

Item 60.1.k - Settlement

Left Abutment:

Fieldstone Breastwall: Below the gunite there are random loose and missing chinking stones resulting in irregular voids below the waterline. The gunite has some flaking and some random map cracking at the joints of the fieldstones.

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REMARKS

Item 60.1.1 - Curtain Wall

Right Abutment:

There is concrete deterioration in several locations in the vertical face of the curtain wall with a maximum penetration of 0.2'.

Item 60.2 - Piers or Bents

Item 60.2.d - Stems/Webs/Pierwalls

There are voids due to missing chinking stones throughout the piers with full depth penetration through dry-laid joints. The gunite is cracked (up to 1/2" wide) and falling off in various locations.

Pier #1:

Concrete Extension: There is moderate concrete abrasion with coarse aggregate exposed approximately 3' high and up to 0.2' penetration.

Fieldstone Pierwall: There is a 0.1' wide crack from the mudline to the cap at Sta 1+02 on the right side of the pier.

Pier #2:

Concrete Extension: There is concrete deterioration at the upstream nose above the curtain wall. It extends the full width of the nose. The maximum height is 2.0' and maximum penetration is 0.4'. Rusty rebars are exposed.

There is moderate concrete abrasion with coarse aggregate exposed approximately 3' high and up to 0.2' penetration.

Fieldstone Pierwall: There are random voids with a maximum penetration of 2.5'.

There is a void at the waterline on the left side of the pier at Sta 1+47 with a length of 3.0', a height of 2.0' and a penetration of 3.5'.

Pier #3:

Concrete Extension: There is concrete deterioration at the upstream nose above the curtain wall with a maximum penetration of 0.5'.

Fieldstone Pierwall: There is a void at the waterline on the right side at Sta 1+56 with a length of 1.0', a height of 1.5' and full depth penetration.

Pier #4:

Concrete Extension: There is a void in the left side of the pier located 3' above the curtain wall from Sta 1+61 to Sta 1+72 with a height of 1.5' and a penetration of 0.4' with rusty rebar exposed.

\There is concrete deterioration at the upstream nose above the curtain wall. Maximum height is 4.0', maximum penetration is 0.5' with rusty rebar exposed..

Fieldstone Pierwall: There is a void in the downstream nose for the full width of the pier with a height of 1.0' and a penetration of 2.0'.

There is a void on the left side at the waterline at Sta 1+47 with a length of 2.8', a height of 3.1' and full depth penetration.

Pier #5:

Concrete Extension: There is concrete deterioration at the upstream nose above the curtain wall. Maximum height is 1.7', maximum penetration is 0.5'. Rusty rebars are exposed.

Fieldstone Pierwall: There is a void on the right side at the waterline at Sta 1+55 (ends at concrete extension) with a length of 5.0', a height of 1.5' and a penetration of 3.0'.

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REMARKS

Item 60.2 - Piers or Bents

Item 60.2.d - Stems/Webs/Pierwalls (Cont'd)

There is a void on the left side at the waterline at Sta 1+10 with a length of 2.0', a height of 1.0' and a penetration of 2.0'.

There is a void on the left side at the mudline at Sta 1+30 with a length of 2.0', a height of 2.0' and a penetration of 4.0'.

Item 60.2.f - Footing

According to plans pier extensions have concrete footings. Footings have a toe width of 1.0' and a height of 3.0'.

Item 60.2.h - Scour

Pier #1:

The top of the curtain wall is exposed on the right side of the pier at the upstream concrete extension with a maximum height of 0.3'. The width of the curtain wall is 1.0'.

Pier #2:

Maximum height of exposure of the curtain wall is 2.0'.

Pier #3:

Maximum height of exposure of the curtain wall is 3.0'.

Pier #4:

Maximum height of exposure of the curtain wall is 2.8'.

Pier #5:

Maximum height of exposure of the curtain wall is 1.7'.

Item 60.2.i - Settlement

There are voids due to missing chinking stones throughout the piers with full depth penetration through dry-laid joints. The gunite is cracked (up to 1/2" wide) and falling off in various locations.

Item 60.2.j - Curtain Walls

Pier #3:

Right Side: On the right side of the curtain wall, for the entire length, there is a formed notch (0.4' high x 0.4' deep) 1' below the top of the curtain wall. There is deterioration in this notch 17' long, beginning at the upstream end. Maximum height is 0.7' and maximum penetration is 0.7'. There is laitance in the notch. There is irregular shaped deterioration at Sta 1+67 with a length of 2.0', height of 1.0' and penetration of 2.0'.

Left Side: There is a notch in the curtain wall similar to the right side. There is concrete deterioration in the notch with a maximum height of 0.5' and a maximum penetration of 1.0'.

Pier #4:

Concrete deterioration in the vertical face of the curtain wall was previously reported. Maximum height was 0.7', and maximum penetration was 1.3'. This area is now covered by cobbles and gravel.

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REMARKS

Item 60.2.j - Curtain Walls (Cont'd)

Pier #5:

Right Side: There is concrete deterioration in the curtain wall at the mudline along the right side beginning at Sta 1+59.5 (0.5' downstream of the construction joint) to Sta 1+64 with a maximum height of 0.7' and a maximum penetration of 0.7'. A formed opening at the mudline starts at Sta 1+64 and continues to Sta 1+74.

Left Side: There is concrete deterioration in the curtain wall at the mudline beginning at the upstream end, with a length of 12', a maximum height of 0.7' and a maximum penetration of 0.7'. A formed opening is similar to the right side.

ITEM 61 - CHANNEL AND CHANNEL PROTECTION

Item 61.1 - Channel Scour

Right Abutment:

There is a concrete curtain wall along the entire length of the abutment. The width of the curtain wall varies. Maximum width is 1.2'. The curtain wall is undermined for the entire length. Maximum height of undermining is 1.0', maximum penetration is 3.0'. At this location the curtain wall is 1.2' wide so this penetration is 1.8' into or under the abutment.

Pier #1:

The top of the curtain wall is exposed on the right side of the pier at the upstream concrete extension with a maximum height of 0.3'. The width of the curtain wall is 1.0'.

Pier #2:

Maximum height of exposure of the curtain wall is 2.0'.

Pier #3:

Maximum height of exposure of the curtain wall is 3.0'.

Pier #4:

Maximum height of exposure of the curtain wall is 2.8'.

Pier #5:

Maximum height of exposure of the curtain wall is 1.7'.

Item 61.2 - Embankment Erosion

At the time of this inspection rip-rap was covered with snow and could not be rated. The previous inspection dated 12/5/12 reported the rip-rap was in good condition.

Item 61.3 - Debris

There are numerous shopping carts, bicycles and other debris under the bridge.

Item 61.6 - Rip-Rap/Slope Protection

At the time of this inspection rip-rap was covered with snow and could not be rated. The previous inspection dated 12/5/12 reported the rip-rap was in good condition.

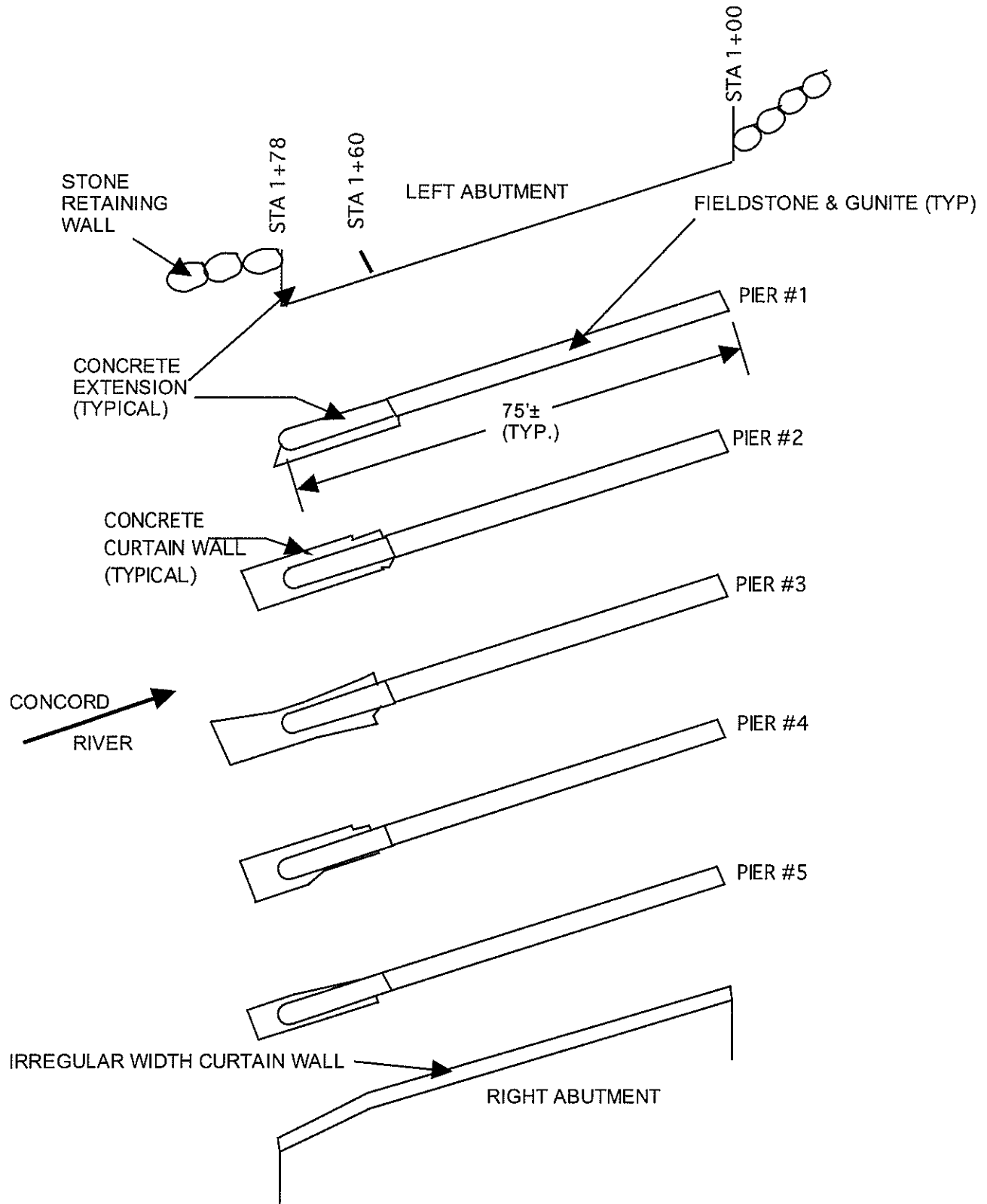
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REMARKS**Sketch Log**

Sketch 1 : PLAN VIEW - NOT TO SCALE

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SKETCHES



Sketch 1: PLAN VIEW - NOT TO SCALE

Report Date: June 15, 2016

State Information				Classification				Code				
BDEPT#= L15031				Agency Br.No.				(112) NBIS Bridge Length				Y
Town= Lowell				L.O.				(104) Highway System				N
B.I.N= 2BQ				AASHTO= 059.6				(26) Functional Class - Urban Minor Arterial				16
RANK= 294 H.I.= 64.6 %				FHWA Select List= Y				(100) Defense Highway				0
(8) Structure Number				L150312BQMUNNBI				(101) Parallel Structure				N
(5) Inventory Route				151000000				(102) Direction of Traffic - 2-way traffic				2
(2) State Highway Department District				04				(103) Temporary Structure				Y
(3) County Code 017 (4) Place code				37000				(105) Federal Lands Highways				0
(6) Features Intersected				WATER CONCORD RIVER				(110) Designated National Network				N
(7) Facility Carried				HWY LAWRENCE ST				(20) Toll - On free road				3
(9) Location				JUST W OF CEMETERY				(21) Maintain - City/Municipal Highway A				04
(11) Kilometerpoint				0001.287				(22) Owner - City/Municipal Highway A				04
(12) Base Highway Network				N				(37) Historical Significance				undetermined
(13) LRS Inventory Route & Subroute				0000000000000				Condition				Code
(16) Latitude				42 DEG 37 MIN 40.00 SEC				(58) Deck				3
(17) Longitude				71 DEG 17 MIN 52.90 SEC				(59) Superstructure				5
(98) Border Bridge State Code				Share %				(60) Substructure				4
(99) Border Bridge Structure No. #								(61) Channel & Channel Protection				5
(62) Culverts												N
Structure Type and Material								Load Rating and Posting				Code
(43) Structure Type Main: Concrete				Code 102				(31) Design Load - Other/Unknown				0
Stringer/Girder				Jointless bridge type: Not applicable				(63) Operating Rating Method - Load Factor (LF)				1
(44) Structure Type Appr:								(64) Operating Rating				52.5
Other				Code 000				(65) Inventory Rating Method - Load Factor (LF)				1
(45) Number of spans in main unit				006				(66) Inventory Rating				34.0
(46) Number of approach spans				0000				(70) Bridge Posting				4
(107) Deck Structure Type - Concrete Cast-in-Place				Code 1				(41) Structure - Posted for load				P
(108) Wearing Surface / Protective System:								Appraisal				Code
A) Type of wearing surface - Bituminous				Code 6				(67) Structural Evaluation				4
B) Type of membrane - None				Code 0				(68) Deck Geometry				4
C) Type of deck protection - None				Code 0				(69) Underclearances, vert. and horiz.				N
(71) Waterway adequacy												7
(72) Approach Roadway Alignment												5
(36) Traffic Safety Features												0 0 0 0
(113) Scour Critical Bridges												2
Age and Service								Inspections				
(27) Year Built				1850				(90) Inspection Date 09/28/15				(91) Frequency 06 MO
(106) Year Reconstructed				1951				(92) Critical Feature Inspection:				(93) CFI DATE
(42) Type of Service: On - Highway-Ped								(A) Fracture Critical Detail				N 00 MO A) 00/00/00
Under - Waterway				Code 55				(B) Underwater Inspection				Y 24 MO B) 03/04/15
(28) Lanes: On Structure 02 Under structure				00				(C) Other Special Inspection				Y 06 MO C) 03/22/16
(29) Average Daily Traffic				006000				(*) Other Inspection (Other)				N 00 MO *) 03/29/11
(30) Year of ADT 2015 (109) Truck ADT				10 %				(*) Closed Bridge				N 00 MO *) 00/00/00
(19) Bypass, detour length				005 KM				(*) UW Special Inspection				N 00 MO *) 00/00/00
(11) Damage Inspection												MO *) 11/13/12
Geometric Data								Rating Loads				
(48) Length of maximum span				0011.6 M				Report Date 10/01/15				H20 Type 3 Type 3S2 Type HS
(49) Structure Length				00062.2 M				Operating				24.0 30.0 45.0 34.0
(50) Curb or sidewalk: Left 01.9 M Right 01.9 M								Inventory				9.0 12.0 18.0 14.0
(51) Bridge Roadway Width Curb to Curb				011.0 M				Field Posting				
(52) Deck Width Out to Out				015.3 M				Status POSTED				Posting Date 12/15/15
(32) Approach Roadway Width (w/shoulders)				011.0 M				2 Axle 3 Axle 5 Axle				
(33) Bridge Median - No median				Code 0				Actual 20 23 40				
(34) Skew 45 DEG (35) Structure Flared				N				Recommended 10 17 25				
(10) Inventory Route MIN Vert Clear				99.99 M				Missing Signs N				Misc.
(47) Inventory Route Total Horiz Clear				11.0 M								
(53) Min Vert Clear Over Bridge Rdwy				99.99 M				Bridge Name				
(54) Min Vert Underclear ref N				00.00 M				N Anti-missile fence N Acrow Panel N Jointless Bridge				
(55) Min Lat Underclear RT ref N				00.0 M				Freeze/Thaw N : Not Applicable				
(56) Min Lat Underclear LT				00.0 M				Accessibility (Needed/Used)				
Navigation Data												
(38) Navigation Control - No navigation control on waterway				Code 0				N / N Liftbucket				N / N Rigging N / N Other
(111) Pier Protection				Code				Y / Y Ladder				N / N Staging
(39) Navigation Vertical Clearance				000.0 M				N / N Boat				N / N Traffic Control
(116) Vert-lift Bridge Nav Min Vert Clear				M				Y / Y Wader				Inspection Hours: 019
(40) Navigation Horizontal Clearance				0000.0 M				Y / Y Inspector 50				N / N Police